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SMITH'S TREATISE

ON THE GROWTH OF

CUCUMBERS, MELONS, &c.

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A TREATISE  
ON THE ARTIFICIAL GROWTH  
OF  
CUCUMBERS AND MELONS,

CONJOINTLY WITH THAT OF

**Asparagus, Mushrooms, Rhubarb, &c.**

COMPREHENDING OBSERVATIONS ON THE

METHODS NOW IN USE FOR THE GROWTH OF CUCUMBERS,

WITH A FULL EXPLANATION OF

AN IMPROVED MODE OF CULTURE,

By which, with a much less quantity of the fermenting substance, and a tithe of the care and attention which is generally bestowed upon them, not only is success rendered certain even in the most adverse season, and fruit of the finest appearance produced, but Asparagus, Mushrooms, Rhubarb, &c. are at the same time, produced, of excellent quality, and with the greatest possible celerity.

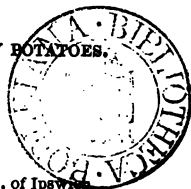
TO WHICH ARE ADDED

BRIEF OBSERVATIONS ON THE GROWTH OF EARLY POTATOES.

---

BY JOHN SMITH,

Nearly Twenty Years Gardener to DYKES ALEXANDER, ESQ. of Ipswich.



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1833.



(BY PERMISSION)

TO DYKES ALEXANDER, Esq.

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Sir,

*The gallant Nelson said in reference to the operations of war—"England expects every man to do his duty," and surely the adaptation of this motto can in no way be more extensively beneficial, than when it is made a principle by those who are engaged in the peaceful occupations of life. And when it is considered that the compages, which form the fabric of society, exist by a mutual dependance on each other, the conclusion, I think, is reasonable, that any improvement which is made in one, must of necessity be for the good of all. That the introduction and culture of exotic plants and fruits form an important part in the commerce, and at the same time, add greatly to the comfort and pleasure of the inhabitants of this country, is a truth which, I presume, will be generally admitted; as a mark, therefore, of that deep veneration and respect which have been inspired by the general good feeling which you have exercised towards me, during a long servitude; to you, as the friend of general improvement, social good order, and individual happiness, I dedicate the following short*

*Treatise on the Cultivation of Cucumis Satibus,*

*IN UNION WITH THAT OF OTHER PLANTS,*

*which I hope will not only be serviceable and give satisfaction to those for whose use it has in a more especial manner been written, but at the same time give rise to experiments which shall be conducive of future extensive and permanent improvements.*

*I remain, Sir,*

*Your obedient Servant,*

*THE AUTHOR.*

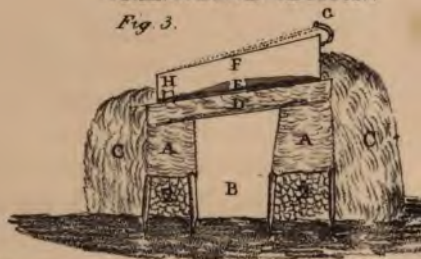






TRANSVERSE SECTION.

Fig. 3.



LONGITUDINAL SECTION

Fig. 2.

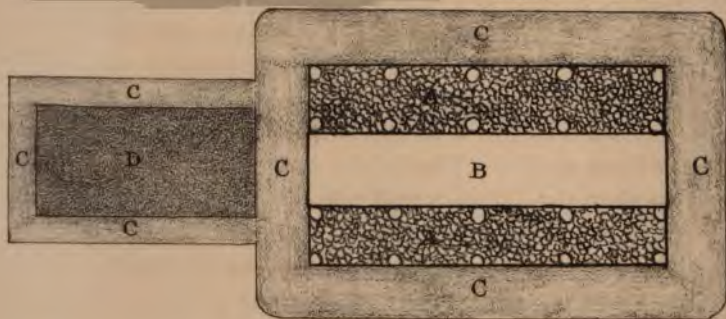


Fig. 1.

PLAN.



## TREATISE, &c.

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Ancient History furnishes us with the information that Cucumbers and Melons were held in great esteem, not only by the inhabitants of Eastern countries in general, but also by the Jews themselves; and in Numbers xi, 4, 5, the writer says, that "the mixt multitude fell a lusting, and the children of Israel wept and said, we remember the fish which we did eat in Egypt freely; the *Cucumbers* and the *Melons*, and the leeks, and the onions, and the garlic." That it was customary to set a watch in the spot of ground which was chosen for the cultivation of Cucumbers is pretty evident from Isaiah i, 8, "where the daughter of Zion is" said to be "left as a cottage in a vineyard, as a lodge in a GARDEN OF CUCUMBERS."

That since its introduction to this Country in the year 1573, it has been with us Britons, of all classes, a great favourite, will be readily admitted. But the

climate of this our Country being less favourable to its growth than that of the East, artificial means are necessarily employed by us to accomplish that object which nature does for them, namely, its successful growth.

Every person who is in any way acquainted with the nature of the plant, knows that it delights in a strong and moist heat, and that as fermenting substances afford the best which can be obtained, these therefore are made use of for the attainment of the above object: but when they operate, or when their heat is brought into action, it often proves that they contain and impart properties which are exceedingly hurtful, and very commonly destroy the very finest plants, and that too when no danger is apprehended.

On the contrary, if the pernicious properties are extracted or properly guarded against, that is to say, not suffered to come in contact with them, there is no heat so congenial to its constitution; nor is there within the Hortus Britannicus, a plant which under a continuance of good treatment repays more gratefully all favors. The modes of treatment which are pursued in the cultivation of this plant are known to be very numerous, and having myself dived pretty deeply into them, I should feel no difficulty in describing (though imperfectly) a great number. Considering, however, that a very few of these contain all the principles, I will confine my observations to them.

The first which I think proper to notice is the common Dung-bed Mode of growing. The preparation of the materials for which, that is to say, the turning over, and over, and over again, take according to some persons account, three, others four, and some six weeks, before they are in a fit state to be made up into a bed; to which add two or three weeks more before the bed is in a proper state to receive the plants, being in all from six to nine weeks in making an imperfect habitation for that humble plant, the Cucumber. Here is a loss of time, labour, and heat with a witness, for when time and labour have been spent so as to reduce the heat of the fermenting substance to almost nothing, then, and not until then, is it in a fit state to receive the plants into it. That there are in practice means used to prevent these evils I admit, but so far are they from being perfect, they only serve to prove that the greatest degree of heat is exactly where least of it is required; as for instance, the well-known practice of placing a slate under each hill of earth where the plants are planted, for the purpose of keeping down the steam, and of pouring cold water under them to kill the excessive heat in that part of the bed, demonstrates, not only that most heat exists where least of it is required, but also, that a great deal of it is (contrary to what it ought to be) WASTED or DESTROYED.

Another great evil is, the bed being composed entirely of fermenting substances, it settles so

much as to render it almost impossible after the heat has once abated to renew the same by the assistance of fresh linings when it is required. To obviate this evil, T. A. Knight, Esq. P. H. S. has recommended the "placing a thin iron or wooden tube from front to back of the leaves or dung composing the bed, and at about one-third of its height from the top. This tube is  $1\frac{1}{2}$  inches in diameter, opens at both ends, but intended to be opened or closed by plugs at pleasure. Three smaller tubes of  $\frac{3}{4}$  of an inch in diameter, are inserted at equal distances into the large one, which rise through the dung and mould of the bed, and discharge by lateral holes near their tops the heated air which rises from the large tube." Without the least desire or intention of abridging the almost matchless skill and perseverance of the WORTHY PRESIDENT, I may be allowed to state, that two or three years previous to his recommending this practice, I had (without a hint from any one) employed similar means for the same purpose; but finding it defective, I discontinued its use the season in which his paper appeared.

Further, some persons have recommended the use of platforms, on which are placed the frame, earth, &c. and the whole supported by posts or brick piers. The space beneath the floor is filled with hot dung, and in some cases, a lining is applied round the outside. I had a structure of this kind under my charge for several years,



and although the best Cucumbers which ever came under my notice were produced in it, and Balsams 16 feet in circumference, yet for want of a proper substance against which to build the linings, and the almost entire destitution of means to supply heat by *absorbition*, and *conduction*, experience has taught me, that the principle cannot with safety be depended upon when used for early forcing.

Of brick pits, perhaps it may be said, these difficulties are removed, but the general objections to them are, the expense incurred in building them, and the quantity of dung required to raise and keep a proper degree of warmth; but the greatest is, that the structure is fixed, and a perpetual habitation of wood-lice, or milepedes. These pits, however, have various good qualities which are well described by Mr. Macphail. The first and greatest of these is, "that the coldest place in the bed is exactly in the centre of each pit; plants being planted in this centre or coldest part of the bed, their roots can never be hurt by the heat increasing on each side gradually, being in every respect suitable for their increase and extension. The heat in the centre of each pit where the plants are first planted, seldom rises higher than to about eighty or eighty-five degrees, nor does it ever rise higher in any part of the pit than about ninety-six or ninety-seven degrees, nor do I believe," he says, "it ever can be raised higher than that, without scorching by top-heat or heated air." Here Mr. Macphail is mistaken. "Whereas in a bed



made of dung, the heat in the centre of the bed under the mould in which the plants are planted, frequently rises to above one hundred and twenty degrees, when at the same time, the air in the frames can scarcely be kept up to a proper degree of heat." This passage from Mr. Macphail is cited as corroborative of the fact, that a very strong bottom-heat is not only unnecessary but exceedingly injurious to the plants while they are in a young state. Whoever wishes for further information as to the advantages of brick pits above the common dung bed, may find the same in Mr. Macphail's works, or in Mr. Loudon's *Encyclopædia of Gardening*—Article, *Forcing Cucumbers*.

On returning to the objectionable parts of these pits will be found those of the "structure being fixed and a perpetual habitation for millepedes." This latter is one so commonly understood as to render observations thereupon useless ; but such not being the case with the former, the following ideas, it is hoped, will prove serviceable. When a structure is about to be formed in which the Grape-Vine, the Peach-Tree, and indeed almost any other plant or plants are to be cultivated, those under whose management it is to be placed, earnestly recommend that it be built so as to have an elevation of about forty-five degrees ; but in the cultivation of the Cucumber, &c. elevation is scarcely thought of by some ; and even among those who have condescended to bestow a little attention to the subject, are

those who have asserted it to be a matter of "little or no consequence." True it is, that the Cucumber &c. do not require so great an elevation as that above-named, but is it right or reasonable from hence to conclude that the subject is one of "little or no consequence"? surely not. But we sometimes say, necessity has no law, and in this case (generally speaking) reason and right have given place to its imperative demand; for let it be remembered, that although the Cucumber requires a considerable elevation in the frame or lights in an early part of the season, for the purpose of receiving the advantage of the rays of the sun, and also to prevent an *over condensation* of vapour: yet, when the season has advanced, and consequently the rays of the sun are radiating powerfully upon the glass, its elevation cannot well be too little, and in this respect, the treatment which is highly beneficial to the plants in one season of the year, may be, and is injurious at another. But it has just been observed that "necessity has no law," and the case before us, I further observe, is a proof of its truth; for when a bed or pit is to be built, there being no alternative when finished, a middle course is pursued as a preventative to either extreme, and this may be said to be favourable or proper only in a medium or moderate state of the weather.

Having in the preceding observations stated some of the objections to the old systems which are used in the growth of Cucumbers, &c. the author wishes

it to be understood, that they are offered without the least feeling of captious opposition, or the smallest desire to depreciate the value of any established mode when properly conducted; and he has as little inclination to insinuate, that better fruit can be obtained by the method herein-after stated than by them. But he confidently asserts, that with a *great deal less of anxiety, care, and attention*, as good fruit may, *by it*, be obtained as by them, and with a certainty of success, nearly approaching to the *rules of Mechanism*. This being the fact, his principal desire is, that by its publicity the Youthful Gardener in particular may be relieved from that constant anxiety and care, which has been the common lot of a great majority of Gardeners, so giving him an opportunity of exercising his mind and talent freely upon subjects which are much more momentous, than the cultivation of *Cucumis Sativus*.

ON REARING PLANTS FROM SEED FIT FOR THE  
FRUITING BED.

The proper season in which to sow seed, is naturally one of the first things which presents itself to the notice of every cultivator, and can be determined upon only by the time when fruit is required at table. If this happens to be in the month of March, it will be needful that the forcing be begun early, and as it is always better to be able to cut fruit a few days before the time at which it is required, than to be under the necessity of waiting one day after that time, I recommend that the seed be sown near about the twentieth day of November.

To those who think plants raised at a later period are more vigorous in their growth than those raised at the time here recommended, I beg permission to say, the idea is erroneous, unless indeed the sowing be deferred until the month of February, which of course would be too late for bearing in March. It is generally admitted that infancy is, in all creatures and things, the most tender age: from this as a principle I contend, that to raise seed of a *tender plant* in the *very dullest* and *severest weather*, is exposing it to difficulties which it is not so able to bear, as it would be in a little more advanced state ;

and in practice it is generally understood, that maltreatment, not age, is the cause of disease, weakness, and decay.

As almost every Grower of Cucumbers has his own favourite variety, advice appears to be almost superfluous. Still upon a judicious choice of seed depends, in no small degree, the prospect of future success: and as nature is so very sportive in the Cucumber family as to render a long list of names perfectly useless, I will content myself with merely stating the properties which it is desirable for the kind chosen to possess; they are as follows—Early-fruitfulness, with a disposition to swell the fruit quickly, great length, uniformity of size, small girth, a fine colour covered with a good bloom, a regular display of black spines, and an inclination to retain the decaying blossom at its end.

The materials necessary for raising plants, are a sound frame of one or two lights, a quantity of stable dung, or the same with other fermenting substances, such as the leaves of trees, &c. sufficient to build a bed four feet high at the back and a little more than three feet at front, with a quantity of very light and dry earth; but as I intend to treat more fully upon the manner of using these materials in succeeding pages, I hope to be excused from further discussion at present, and respectfully refer to the subject under the fruiting-bed department.

Supposing this to be done, build the bed as there directed, place the frame upon it and when the heat

has risen to 70° Farenheit's scale, cover the surface with slate or very thin boards, and these with light dry soil sifted moderately fine to the depth of from three to six inches all over the surface, which will present an inclined plane from north to south, and which in an early season is of essential service.

The seed may now be sown in the following manner. Take as many pots, No. 48's, as you wish to have furnished with plants, fill them half full with good rich soil, into which insert two seeds of the last years growth, which cover with earth one inch deep. The warmth of the bed being brisk the pots should not be plunged into the soil, but suffered to stand upon the surface in such a position as will most expose them to the rays of the Sun; and if the heat of the air within the frame be kept up to 70° or 75° Farenheit, it will be best to have the pots stand on the surface all the time the plants reside in this—the seed bed. When they are grown to the size at which (in the common mode of treatment) they are fit to be potted off, or transplanted, take a little vegetable mould, previously warmed within the frame for the purpose, and into each pot put as much as will reach nearly to its rim, and on the appearance of the first rough leaves fill them quite full, observing always to do it with a careful hand, so that the plants may not be injured by the operation. The slates which are placed beneath will prevent damp from rising through the mould, and keep the air in the frame nearly as dry as it would be if it were

heated by fire : in it the growth of the plants will not be so rapid, nor will their general appearance be so fine, as if in a more humid atmosphere : suffer not this, however, to be a stumbling block, but remember that *haste* is commendable only in connexion with *good speed*, and that plants over-luxuriant in a moist air, are much more susceptible of injury from sudden changes than those which are in a moderate (but healthful) state of growth ; for when the weather changes suddenly from a mild and fine state to that of severe and dull, the latter will remain uninjured, but the former being full of growth will receive a severe check, and the inevitable consequence is mildew or canker, succeeded most commonly by death.

Here it is that many, *aye* and *challengers too*, have to their great mortification stumbled and fell ; but the writer of these observations having never been so unfortunate, he confidently asserts that (even in error) the arid is the safest side on which to be. Notwithstanding this, it will be needful to give the plants gentle waterings at all times when they need it, but in severe weather and in a low temperature, great caution should be exercised ; in fine weather, and in a strong heat, however, they may be watered freely, and the earth round the side of the bed should also be attended to in every favourable season, and at all times remembering to make use of water warmed to about 70°. And should the weather change very suddenly from a favourable to an unfavourable state after watering



it will be proper to stir the soil within the frame, so that the under and dry part thereof may be brought to the surface ; of course this must be done as quickly and carefully as possible. This stirring of the soil should be frequently performed, in order to prevent the air of the bed from being corrupted by putrid or unwholesome earth upon the surface.

It will be proper to give air to the seedlings whenever the Thermometer indicates the heat to be any where about  $70^{\circ}$ , this should be done as directed for the fruiting-bed, under which department will also be found directions for renewing and retaining the heat, all of which are to be attended to as well in the seed as in the fruiting bed, but the medium heat of this being  $70^{\circ}$ , a more gentle force is here required.

When the plants are grown so as to have two rough leaves each, the shoot which is made above the upper one must be pinched off, as soon as it is large enough to take hold of with the finger and thumb. The plants will then send forth two strong shoots each, and when these are grown to about an inch in length, the plants are fit to be planted in the fruiting-bed. This, generally speaking, may happen to be not later than the beginning of the year, but the exact date or time they will arrive at this state, it is impossible to say, because a great deal of their progress depends on the state of the weather, which it is probable may have been very cold and unfavorable ; and although the bed in which they have been grown is in all respects favorable, yet the pressure of



cold air may have been so great, as to render it difficult, in this their youthful state, to have good speed attended with anything more than slow progress.

I have known instances of Cucumber plants being kept, for a week or two, in as low a temperature as from  $40^{\circ}$  to  $50^{\circ}$ , and have not received the slightest injury thereby. This is mentioned merely to show that although the plant delights in a high and moist heat, yet in cases of great difficulty as above, the bed being free from damp, and well secured from extreme cold, by good coverings of mats, &c. at nights, there need to be no great fear entertained respecting them; and consequently a bed in which they are to produce fruit, will be required, the preparation, construction, and management of which, I now proceed briefly to notice.

TO BUILD A CUCUMBER BED, IN WHICH A PROPER QUANTITY OF DUNG AND EARTH WELL DRAINED FOR THE PLANTS TO FEED IN, WITH HEAT SUFFICIENT FOR THEIR GROWTH, WITHOUT DOING VIOLENCE TO THEM IN THE FIRST INSTANCE, BUT CAPABLE OF BEING RENEWED TO ANY EXTENT AT PLEASURE, AND AN ELEVATION SUITABLE TO THE SEASON, *seems to be the desideratum long time sought to insure certain and successful growth.*

Before I proceed to state that in which these advantages are concentrated, I shall take some notice of the needful materials.

The first of these which require to be in readiness, is a quantity of stones or brick-bat rubble: next to these, a quantity of good stable dung, or a mixture of it with other fermenting substances, such as leaves of trees, &c. The state in which they should be made up into a bed, is that in which they will be likely to hold heat the greatest length of time, and which I believe to be, is when in a medium state of fermentation. A quantity of wattled work will also be required; and next to this, I shall notice some good earth laid to dry in some convenient place:—this should consist of two kinds; one should be good

sound earth, if attainable, the top spit from an upland and loammy pasture, and the other, a composition of vegetable substances, well reduced, the leaves of trees are to be preferred to any other. The last which I need now mention, is a common frame and lights. The frame which should be one of three lights, may be of the plainest description; it need not be dove-tailed at the corners, but the backboards, which should be near two feet deep, and the front, which should be about one foot deep, may be merely nailed over the ends, made stiff with good uprights, one in each corner, and every joint must be made steam-proof. The lights may also be of the common kind; but the styles, on each side, should not project more than one inch beyond the end-rails: the handle should also be subject to this rule, and if there be no projection at all it will be the better.

## DIRECTIONS FOR BUILDING THE FRUITING-BED.

The frame for this should be from four to six feet wide, in preference we will suppose it to be the latter, and twelve feet long. To build a bed for such an one, proceed as follows. In a situation well sheltered from winds, and fully exposed to the sun, mark the dimensions of the frame on the spot where the bed is to be built; drive a stake near each corner, so that they stand to within one foot of the width of the frame, north and south, and one foot longer than it east and west.

The two stakes on the north side should be about four feet high, and those on the south three feet six inches: drive two rows of stakes in the following manner; one row on the north side of the line, which may be drawn from the two tall stakes on the north side of the intended bed, and one row on the south side of the said line; each row of stakes should be about one foot three inches distance from the line drawn from the tall stakes at the end. The short stakes are merely to give stability to the foundation of the bed, and should be about fifteen inches high, and so driven as to have their tops a little inclined towards each other. There must be two rows driven in like manner on the south side,

with this difference only, that they should be one foot instead of one foot three inches distance, from the line which is supposed to be drawn from the two stakes at the end.

Having finished these, proceed to the building of the Cucumber bed, which begins on the north side, by weaving a quantity of sticks, or spray wood, along each row of short stakes, so that the stones, or brick-bat rubble, may be confined and prevented from falling through when they are placed between them, which they should be in a sufficient quantity, to reach to within an inch or two of the top of the stakes : if these cannot be conveniently obtained, a quantity of faggot-wood, refuse of pruning from the garden, or any sort of spray-wood which may happen to be most readily procured, will do for the purpose : it should, however, be packed very firmly, so that when the bed is built thereupon, it may not settle but very little. This being done, build upon it a quantity of stable dung to the height of the tall stakes at each end ; this should be done according to the practice in building the common hot-bed, that is, begin with the longest and worst sort of dung, or litter, and so continue that the shortest and best may be worked on the top, remembering also to shake and beat the whole so that it may be firm, and at the same time free from irregularities. This wall which at its base is two feet six inches wide, should, when finished at the height of four feet, be gradually reduced to something less than two feet in width at the top. The south-side wall may now

be built in the same manner, when finished, it will be three feet six inches high. It will be proper in this stage of the business, to trim the inner sides of the walls, and also to beat them a little with the back of the fork: gather up the litter, and make the bottom quite clean.

The walls being finished, procure a few pieces of wood strong enough to bear a sufficient quantity of earth, &c. cut them the required length, that is to say, about six feet six inches, lay these cross-ways, so as to serve as beams one end on one wall, and one on the other: upon these, being best for the purpose, lay wattled hurdles, or if they cannot be conveniently procured, the best substitute which occurs. Having done so, proceed to build upon the wattled-work, and also on the two walls, as much good short and rather dry dung, either fermenting or otherwise, as will be needful for the plants to feed upon, which we will suppose to be about nine inches deep. When finished, place the frame upon it in such a position, as its back and front may have a pressure upon the ends of the cross-pieces which are beneath the wattled-work, and also that the roof, or top, may have an inclination toward the south, of from eighteen to twenty-four inches. Put the lights upon the frame, and cover them with garden mats, which will cause the heat to rise more quickly: each end of the bed should be stopped up with fermenting substances, or litter, of any kind, to prevent the escape of heat; the best way is first to place a few

pieces of board, or stakes, and build a lining very firmly against them : there should also be a quantity of litter placed against the bottom of each wall, high enough to prevent the steam, or heat, from passing through the rubble which forms the foundation of the bed.

The heat will now be several days before it rises in the frame, and therefore preparation for the growth of other plants should be made in the interval ; for although the bed above-described contains only half, or thereabouts, the quantity of fermenting substances, which one of its size built according to the common practice would do, yet will its heat be found to be great, and indeed more than will, in the first instance, be required ; consequently, a portion of it may be spared, and employed very advantageously in the growth of other plants, which are of EQUAL IMPORTANCE with those for which it was ORIGINALLY DESIGNED. Of these, I will first take notice of *Asparagus*.

When any specie of plants, with excellent qualities as a vegetable, possess that of being easily forced, and by that means, capable of being enjoyed at table for a long season, and that too in which but few others can be obtained, and those of the commonest kind, it certainly is one which deserves more than an ordinary degree of attention. Taking it for granted, that every person conversant with the subject, will allow, that *Asparagus* possess these qualities in an eminent degree, I venture to hope, that



the following easy and inexpensive mode of culture, will be acceptable.

Take a common two-light frame, rather small than otherwise, which is supposed to be four feet wide, and eight feet long. Mark its dimensions on the ground at one end of the Cucumber-bed, directly opposite the vault which is beneath it, and in a line parrallel therewith, but not so as when fixed to have the ends of the two frames nearer, than two, nor more than three feet distance from each other : raise the earth on this spot about one foot high, and six inches broader than the frame all round ; this may be done with any substance which is most readily obtained ; but the best way is to lay about nine inches deep of spray-wood, and after laying a quantity of litter to prevent the earth from falling through, add about three inches of good soil, which being done, place the frame upon it, and then add three inches more of light, rich, and rather sandy soil. Upon this, the plants, which should be three years old and strong, may be planted ; this should be done according to the common practice, that is, the roots should be trimmed, and the plants packed quite thick, and then covered with the above-named soil to the depth of from three to six inches : if, however, the former be chosen, it will be needful to add more when the plants begin to vegetate, and therefore, generally speaking, it will be best to have six inches deep in the first instance. The lights for this frame, should have their glass lappings puttied



up, or laid in lead, so as to confine the heat within the frame as entire as possible. They may now be placed upon the frame, and no further notice taken of them, until the heat in the Cucumber-bed has risen to its required height. But supposing that some persons may be inclined to grow Mushrooms, in preference to Asparagus, and as that vegetable may be grown MOST SUCCESSFULLY by the means here to be employed, I will now offer, very briefly, a few needful remarks.

Mushrooms, though indigenous to this climate, are, nevertheless, very delicate things to force; and it is somewhat remarkable, that impatient as they are of over-bottom heat, when grown upon dung ridges, yet, where they grow spontaneously, their crop is generally most plentiful after the earth has been heated to a great degree, by the radiance of the sun, as for instance, the autumn which succeeds a very hot summer.

Every husbandman, and even the cow-boy, who with his feet in the morning, brushes the dewy-grass, knows that dull days, long nights, and heavy dews, with a mild and temperate atmosphere, constitute that state of weather in which Mushrooms grow most luxuriantly.

Three years only has elapsed, since the writer of these observations began to think upon this subject, and that in consequence of having experimentally learned, that a quantity of heat might be drawn from the substance of a Cucumber-bed, with advan-

tage to the plants which grow upon it, and as already hinted, employed in the growth of other plants. Every experiment which he has subsequently made, and every observation which he has taken, confirms him in the idea at that time conceived, namely, that a warm and damp atmosphere, would ultimately be found to be most suitable in the artificial growth of Mushrooms; and he is happy in stating that agreeable with this, his opinion, is the best authority, as may be seen by referring to Callow, on the Artificial Growth of Mushrooms, page 18, where he says, "It was from reverting to the causes of the frequent failures in obtaining crops, and from attentively considering the peculiar habits of the vegetable, when growing in a natural state, that I was led to abandon the most uncertain dung-ridge culture, as well as the use of fire for heating the Mushroom house, and to substitute instead, the steam of hot dung, by which a more uniform temperature can be obtained; while by introducing its moisture into the interior of the house, an atmosphere can at will be formed, somewhat resembling that of those close foggy mornings, which even the uneducated husbandmen, from observing effects, call 'Mushroom-weather.'" Mr. Loudon, the conductor of the Gard. Mag. in vol. 8, page 214, after noticing and recommending Mr. Callow's work, writes, "It must be evident, we think, to every gardener, that Mr. C's is a very certain and economical mode of raising Mushrooms; and it may be proved in any common pit, or even

frame, substituting thatched-boards for the glass sashes." Mr. Loudon, in this, is perfectly correct; but the method by which the steam, or damp-heated air should be introduced into the frame, remains to be shewn.

The length and breadth of the frame, with the manner of placing it for the growth of Mushrooms, may be the same as directed for that of Asparagus: but it is essentially necessary, that the drainage there recommended be properly made; and it is desirable that the frame should be rather deep than otherwise, and also, that as recommended by Mr. Loudon, for a covering, "thatched boards be substituted for glass sashes." The frame is supposed to be two feet deep all round, and the drainage one foot deep, built so as to have an inclination of near about one foot in four, or the width of the frame, which being placed upon the drainage, proceed to pack very firmly, a quantity of dried horse-droppings within it, to the depth of ten inches; place the thatched boards upon it, and return to the Cucumber-bed.

From the time when the Cucumber-bed was built, until that of the heat rising in the frame, there will be an interval of from three to six days; but when it has risen so as to raise the thermometer to about  $85^{\circ}$ , it will be proper to open the lights about two feet wide, for the purpose of letting the steam pass off the bed, which it will do within an hour or two after the air has acted upon it. The bed is then in a proper state

to be earthed, which do, after mixing the soil or compost, which must be taken from the two heaps of earth already noticed. The proper way to use this is simply as follows:—if the forcing commences early, take the principal part from the light heap or vegetable mould; if at a more advanced season, more of the solid earth should be used, varying the proportions to about three-fourths of either, according to the season. The soil being properly mixed, and the surface of the bed made smooth, cover it to the depth of two inches, and under each light raise a hill of the same sort, not sifted but properly broken, to within ten inches of the glass; if any fear be entertained that the plants are likely to be burned, which, however, is not probable, that fear may be put to flight by placing under each hill of earth a slate or board about fifteen inches in diameter; shut up the lights until the next morning, and if upon inspection the thermometer indicates a heat of about 80°, or any where between 75° and 90°, the plants may, after taking the necessary precaution of giving air sufficiently to reduce the heat to 70°, be immediately planted.

Meanwhile the heat of the Cucumber-bed is being reduced, the Asparagus, or the Mushroom-bed, should be attended to. Take a metal or wooden tube, open at both ends, not less than two inches in diameter, nor less than four feet long, and having cut a hole in that side of the frame which is nearest the Cucumber-bed, remove the litter which block-



ades the end of the vault sufficiently to admit the placing of the tube, one end in the vault, and the other in the hole which has been cut in the side of the frame; it should be placed in an inclined position towards the vault, but not so as that its end be nearer the ground than about one foot.

The end of the tube which is inside the frame, should have a plug fitted to it, in order that it may be opened or closed at pleasure. If a more perfect one should be thought requisite, one might be employed which would reach the whole length of the bed with the end inside the frame closed, but with a quantity of smaller lateral holes, by which the heated air could be discharged whenever it might be needful, by means of a stop-cock, which should be in that part of the tube where it enters the frame; or instead of this, small plugs may be employed, one to each lateral hole, which, by them, may be opened or closed at pleasure. This being attended to, replace the litter at the end of the vault, and it should be placed so as to encompass the whole length of the tube, and also press against the side of the frame, against which there should be a board placed in an inclined position, so as to prevent the bed from being over-heated on that side, which but for this precaution, it would be; this board will form a sort of flue, and may be opened at either end, or closed, as may be deemed necessary. There should also be a gentle lining built round the bed, in which either the one or the other of these vegetables are grown, and the lights or boards generally

kept very close. It is almost unnecessary for me to add, that the end of the tube which conveys the heated air from the vault into the frame, should generally be closed when its roof is taken off. The tube being fixed, and the necessary protection of the frame having been attended to as above-recommended, the plugs may be drawn for the purpose of giving admission to the heat from the vault into the frame, and immediately this is done, place on it the proper coverings.

If Asparagus is that which has been made choice of, a very little attention only will be required; but it may be that the plants will require a small quantity of water about once in a week: the degree of heat must be regulated by each person, according to the time at which the crop is required to be gathered for use. It should, however, be remembered, that although there has been no means used to produce bottom-heat only by the confinement of heated air, still vegetation proceeds at a more rapid pace by this means than by the very strongest bottom-heat; so powerful and so congenial is its nature and operation, that the author in the latter end of February, or beginning of March, has cut this vegetable of excellent quality which had been planted not more than ten days, and Sea-Kale in the same ratio. Should it be desired to have the Asparagus of a green colour, this may be effected by giving air on favourable occasions; but as the excellence of this vegetable is by most people con-

sidered to consist in a delicate whiteness, the lights ought, as in the growth of Sea-Kale, to be kept closed, and closely covered up with garden mats.

Should the growth of Mushrooms have taken the precedence, it will be proper to admit the heat into the frame in the same manner as for Asparagus; and when the bottom-heat is ascertained to be steady, and at about 70° or 80°, which will be in a few days, it should be spawned and earthed in the regular way:—that is, a quantity of good spawn being obtained, (and it should be remembered that brick-spawn, such as is sold by the nursery-men, is generally the best) small pieces should be inserted at regular distances of about four or six inches; this should be done with the fingers, and no deeper than to be just admitted into the surface of the bed, which may be earthed immediately after this planting is finished. The soil used should be good sound earth, such as is principally recommended in the growth of late Cucumbers; it should be sifted, and laid on the bed, and also pressed down firmly, about one inch deep. The dampness of the air will render watering almost unnecessary, but whenever that element is employed, it should be warmed near to the temperature of the air inside the frame, and which should be kept ranging between 55° and 70°.

At the very moment these observations are being penned, the writer has a Mushroom-bed which has been made as above about three weeks. The spawn has already extended itself, and the Mush-

rooms are making their appearance most plentifully in every quarter. Their future management, of course, must be attended to, according to established custom, or the same varied from at individual discretion; \* and when the bed is nearly spent, whether of Asparagus or Mushrooms, there should be one built at the other end of the vault, in the same manner as the former, to succeed it.

Rhubarb is very successfully forced inside the vault, by plunging a plant or plants in the soil near the end which is not employed for Asparagus, &c. and should there be any fear of danger from a too great quantity of effluvia, it may be avoided by placing a large garden pot over it. It will be needful always to have a quantity of these as well as of Asparagus plants in readiness, or the same may be always obtained at the Nurseries.

Having digressed from the consideration due to Cucumis-sativis, in the previous observations, by stating what seemed to me to be needful concerning its co-partners in cultivation, I will now shortly notice one of their common foes.—Woodlice, or Milepedes, are a very numerous family, and to Cucumbers and Mushrooms, they are very injurious. The best means of destroying them, I believe, is, first to entice them into some part by dry litter, crumbs of cheese, &c. and being collected, pour upon them boiling water from the rose of a common watering-pot; this may be done

\* See Gallow's Treatise on the Growth of Mushrooms.



with good effect in the vault beneath the bed, where the Cucumber plants are to be planted, which, with their future management, now demands regular attention.

The plants made choice of should be those which have the longest and clearest stems, and if they are emitting roots just above the surface of the soil, they should be chosen in preference to any other, unless their foliage or shoots are deformed, in which case they must be rejected. One, or at most, two plants will be sufficient for each light, and they must be planted in the hills of earth raised in the centre of each, in the usual way; that is there must first be a hole made, large enough to receive the entire ball of earth, which is to be turned out of the pot very carefully, and placed in it. The earth must then be drawn up with the hand round about the roots, and also a little way up the stems of the plants, so that the seed-leaf be not more than one, or at the most, two inches above the soil; these hills of earth may be nearly one foot broad at the top, and within nine inches of the glass; but in this last there may be a variation from nine to fifteen inches, as the strength of the plants and other circumstances may dictate. The plants being planted, see that the earth all round the side of the frame, and all over the surface, be regulated properly, so that the steam does not come through it in currents, and when this is attended to, and the plants moderately watered, you may close the lights with full confidence that your labour has not

been spent in vain. Nevertheless, in order that the fruit may be produced in liberal quantities, and of the finest quality, it will be necessary to give unceasing attention to the plants in several particulars; the first of which I notice, is the regulation of heat.

In this early state of their growth in the fruiting bed, it is desirable to have the thermometer ranging between 70° and 80°, and as the heat of the bed is supposed to be rather brisk, it will be proper to admit a sufficient quantity of air to keep it within the above points. Upon this subject, however, great caution being needed, it is right to offer an observation or two.

First, it is very common when the heat of the bed is high, to give a little air to the plants during the night, and as the weather may be calm, nothing more is thought upon the subject than letting a little heat out of the bed; but in the morning, something, in all probability, is wrong. The plants are not looking so well as they should do, and frequently we wonder what is the cause. Again, it may and very often does happen, that in the daytime when the sun shines, and the heat inside the frame is thereby heightened, we give air freely, leave it for half an hour, more or less, and when we return, we learn, to our bitter disappointment, that our absence has been too long, for there has been a breeze of wind, it has blown in at the back of the frame, driven the steam upon the foliage of the plants, and it may have been at a time when the

sun was shining upon them, and they are pinched almost to death, by circumstances, which under proper treatment, might have been conducive of great good to them. These evils arise from a want of due caution in giving air to the plants, for in both cases the sustained injury is supposed to have proceeded from the steam or moist air of the bed having been driven upon them, by the wind blowing in at the back of the frame.

But there is yet a more general and powerful foe against which it is desirable to be guarded. AMMONIACAL-EXHALATION, or what we Gardeners term, "rank steam," is that to which I allude, a very small quantity of which, when it comes in contact with the plants, renders them unworthy of further notice, and in most cases will utterly destroy them. This gas has its origin from the fermenting substance, which, however, is avoided in that of the bed, but exists in, and arises from, the linings which are necessarily employed round about it, to impart and preserve therein, a proper degree of warmth : hence, some persons recommend working over the dung which is intended for the linings, in the same manner as they do for the bed, before it be used. Others recommend that the linings be built only to the height of the substance of the bed. There are many practices in use as preventitives, and although they are creditable to those who follow them, they are, nevertheless, dangerous, inefficient, or otherwise very troublesome. That which I have found

to be a perfect preventive to the evils above-named, is at once efficient, and easily applied; it is as follows:—

Take a common Russia mat, cut it into strips of about eighteen inches wide, lay these on the upper part of the lights so as to hang over the back of the frame, about two or three inches deep; upon the edge of these nail a narrow spline the whole length of the frame, the nails should be driven at distances of not more than six inches, and the lower part of the mat entirely confined between the frame and the spline. When finished, let the upper part of the mats remain on the lights, but not so far as to shade the plants, or indeed the upper part of the bed; this may easily be prevented by rolling them upon the upper rail of the lights. Air may now be given whenever it is required, and by fastening the top of the mats so as to prevent their being blown down, the plants are secured from harm, either from the wind or the entrance of steam arising from the linings, even though they (as they should) be built to within an inch or two of the mat curtain or guard; for by it the air is softened in its passage to the interior of the bed, and the vapour which rises from its linings, is effectually conducted another way.

Covering the bed at night is also an operation which is connected with the regulation of heat, and must be attended to from the very commencement of forcing. When the bed is about to be covered up for the

night, there are two things to be considered ; one is the state or heat of the bed, and the other the state of the weather ; if both these should be favourable, a thin covering will suffice ; by a thin covering at an early season, two mats thick only is intended ; but should the heat of the bed be declining, or the weather any ways unfavourable, it will be requisite that the covering be thickened by placing between the double matting a quantity of dry hay, which should be proportioned according to the existing state of things ; that is to say, if the weather be very severe, and the heat of the bed not likely to be very high, a thick coat of hay should be given ; but if the weather should be more moderate, then, of course, there need not be so much, and as the season advances it should be gradually reduced, and at the last left off entirely, but as this will not be safe until the month of June, I will take no further notice of the subject, but leave it to be decided upon by the heat of the weather and common experience.

As soon as the heat of the bed begins to decline, it will be needful to build linings against the back and front of the bed, to keep it up to a proper height : when therefore a quantity of dung is obtained sufficient for the purpose, the back of the bed ought to be the first which receives attention. The dung made choice of for building this north lining should be stronger than that to be used on the other side, and may be taken fresh from the stable, or otherwise, as may be most convenient. The

width of the lining may vary according to circumstances, from eighteen inches to three feet: it should be built very firmly against the bed, and reach to within a few inches of the top of the frame, and though contrary to common practice, should be made nearly of a width the whole of its height. The practice of laying boards on the top of the linings should not be used here, except when first built to draw up the heat, for, generally, the practice is a very injurious one, as it confines the heat too much, and causes the earth within the frame to be over-heated, or what is termed, burned.

This is a subject which ought always to be attended to, for the earth to the depth of two or three inches, should be kept close to the side of the frame within-side, and in a comfortable condition: if at any time its appearance indicates too much heat, it will be requisite to stir the top of the lining so that it may, for a time, press more lightly against the frame.

Whenever it may be thought advisable to renew the lining, it may be done, first, by adding a quantity of fresh litter, or dung, on the top, which in a short time will have settled below the requisite height; and when these additions appear insufficient for the purpose of keeping up the heat, the whole must be shaken or worked over as when it was first built, and with it a quantity of fresh fermenting substance, sufficient to impart a lively warmth through the whole

mass. When the old lining or part of it is removed, it will be proper previous to rebuilding it, to make a row of holes just under the wattled-work; they may be made with a stiff stake, and should be about eighteen inches or two feet distance from each other through the whole length of the bed: these, with the rubble below, will be useful in admitting the heat into the vault, and from thence to the Asparagus, or Mushroom-bed, and also to the front of this within the frame, by means of a quantity (about two under each light) of common flower pots, No. 24<sup>s</sup>, reversed and fixed in the soil two or three inches deep, near the front or lower part of the frame. These pots should each of them cover a hole two or three inches in diameter, which should be made from thence into the vault which is beneath the wattled-work, for the purpose of admitting the heat to rise from it into them; thereby causing a lively warmth in that part of the bed, where, generally, a cold dampness exists, or otherwise, when a remedy is sought by the application of a powerful lining the plants sustain injury, and the elevation of the frame, &c. instead of being reduced is thereby increased. The holes at the top of the pots must be stopped with plugs, in order that the steam may not pass through them into the air of the bed, where the plants are growing, except it be at a time when there is a clear understanding that nothing exists in the vault, which would be injurious to them and which at an early season will be but very seldom.



In building the front or south lining, the dung or litter used should be more moderate in its power of heating, for there the roots of the plants ought in a more especial manner to be encouraged; consequently, some of that which is refused on the north, should be employed in building or rebuilding this. When finished, it should be protected from a superfluity of moisture, which may always be done by the use of oiled calico, canvas, boards, or slate; and as the dung here is considered to be not so hot as on the north side, no fear of over-heating need be entertained, as on it, where as I have already hinted, the dung may be used fresh from the stable, or otherwise, as circumstances happen to be.

I have already stated one of my objections to brick-pits, upon the ground of their "being fixed and incapable of giving the proper elevation:" and be it further observed, that the common dung-bed is subject to this imperfection; or otherwise, when a remedy is sought by lifting that side which it is desired to have raised higher, the roots of the plants are exposed to injury in the operation, which very often makes the remedy to be worse than the disorder.

The structure adverted to in the preceding pages, however is not the subject of this evil; for the north-wall, which in the first instance is the highest, consequently that which gives the proper elevation, being composed principally of fermenting substances is gradually reduced in height, as the season ad-

vances, by the application of more powerful linings to it than to the other, or south wall; and is also properly effected without any sort of derangement or inconvenience whatever, except the necessary care which is paid to the renewal of heat, by proper attention to the linings, which should be continued until the heat of the weather renders it useless. Having proceeded thus far in detailing the external means which are essentially necessary for carrying on healthful growth within the frame, I beg leave to state, it has been done under the supposition that the whole is well defended from the effect of the wind; but should the directions previously given on this point have been overlooked, the inconvenience attending such neglect will be found to be very great, because a few hours strong wind will drive away a great deal of heat, without which, success is impossible; it therefore must now be properly attended to.

In returning to notice the inside of the frame, it will be found that the plants are in a comfortable situation, so that instead of standing still for a week or two after they are turned out of the pots, as is usually the case, or what is still worse, going backwards never to be recovered, they immediately go forward and give evident proof that they are among the most grateful inhabitants of the vegetable world: and after being planted in the hills of earth a few days, they will push forth a quantity of roots, so that they are visible on the sides and on the tops of these

**hills :** when this happens, there should be a quantity of the proper soil, not sifted, but properly mixed, broken, and previously warmed within the frame, added thereto, so that the roots are covered with it, and also a little put on the surface of the bed ; and when the roots again make their appearance, they should be covered as at first, and so continued until the whole surface of the bed has risen to within two or three inches of the top of the hills, which from the time the plants were turned into them, may be two, three, or four weeks.

I have recommended that the soil made use of in earthing the bed, should not generally be sifted, the reason for which has been, that a finely sifted soil is inconsistent with the nature of most plants, but especially that which is under consideration : still there is, at an early season, this to be considered, namely, that every clod of earth forms a shade on one side ; consequently, although the soil in which the roots grow should be rough, yet a small portion, that is, what is spread on the surface, may with propriety and advantage, be sifted. It should, however, never be pressed, but permitted to lay as light as possible, in order that the roots of the plants may have a free passage in every part of the bed, and also, that the heat may in no way be impeded in its progress upwards, nor should there be, as is the custom with the Dutch Gardeners, oiled paper laid upon the surface to keep down the steam.

When the plants have made two or three joints beyond where they were stopped in the seed-bed, it will be proper to stop them again; and should any fruit appear on any part of the plants, it is better that it, together with the male blossoms, should be taken off, than that they should remain. The next shoots which are produced, will, in all probability, shew fruit at their second or third joint:—these must be carefully preserved, as by this time the plants will have strength sufficient to swell them to a state of perfection, fit for table. Male and female, or fruit-bearing blossoms, are easily distinguished from each other before the blossoms expand, for the males have no fruit at their base as the females have, and which are plainly to be seen in miniature, even before the bud shews any of its blossom-like shape. From the first appearance of the fruit until its blossom expands, there will be an interval of many days; but on the day in which the expansion takes place, (the bees being not yet at work) each one should be set in the usual way, which is as follows:—Take off a male blossom, which, as already hinted, may be easily distinguished from the females, by not having any fruit at its base; and they may also be known from the females, by their possessing stamens, which is not the case with the females, they having only “three pointed filaments without summits.” Having taken a male blossom fully expanded from off the plant, strip off its flower leaves, or petals, minding that the stamens be not injured by the

operation, then hold it between the fore-finger and thumb of the right hand, until the female or fruit blossom be gently taken hold of with the left hand, and holding it between two fingers, apply the prepared male blossom which is in the right hand, close to the centre or stigma of the fruit blossom, twirl it round a little, so that its polen may be discharged thereon. Every fruit which it is desired to have swell fit for the table, must be set in like manner, and for every one take a fresh male blossom, unless the latter should be scarce, in which case, two or three female blossoms may be impregnated with one male, by the use of a camel's-hair pencil; when this is used, it will be proper to take a little dust, or polen, from one side only at first, which having applied to one female, proceed to take the said dust from the other side of the male blossom, and apply it to another female as before.

Any shoot which does not shew fruit at the second, third, or fourth joint, should be stopped, or pinched off, generally at its second bud, and this stopping should be continued until it becomes fruitful; but as this, in most cases, will increase the number of shoots, care must be taken that they become not into a crowded state, which may always be prevented by the use of the pruning-knife; indeed that instrument should generally be used very freely upon Cucumber plants; but the distance at which one principal branch should be from another principal branch, is a matter which must be decided upon

by every person, according to the strength of the plants, the size of their leaves, &c. When a fruit blossom has been impregnated, the shoot which bears it should be stopt at the joint where the fruit is, or at furthest, the one next beyond it, and in about two days, it—the fruit, should be laid in a glass tube or cylinder, about three inches in diameter, and from twelve to eighteen inches long; or in lieu of this, use a wooden trough, formed with three thin pieces of board, of from two to three inches wide, and as long as the fruit is expected to grow, say fifteen inches; these must be nailed together at right angles, so as to form three sides of a square, and at about an eighth of an inch from the bottom of these, there should be laced small copper wire, an inch apart, cross-ways, and the whole length of each trough. The fruit being placed, in which care should be paid so that the fruit do not press against their sides, except for the purpose of straightening them; and even should this be needful, it will be proper to place a small and smooth piece of wood between those parts which come in contact with each other. The troughs should be placed in the frame so as to have a little inclination to one end; and when the plants are watered, the fruit should be covered with a piece of glass, the use of which is to prevent the water from falling upon the fruit, thus keeping its natural bloom entire all over its surface, and also preventing the destruction of the decaying blossom at its end, by wetting it.

The length of time which the fruit requires to obtain the desired length, depends in a great degree upon the heat of the bed, and the state of the weather: supposing these to be favourable, it may, upon an average, be expected to grow at the rate of two inches in length, every twenty-four hours,\* which, of course, will yield a fruit fifteen or sixteen inches long, in seven days from the time of its being set, and having been treated as here directed, will generally be of a good shape, and free from discolouration.

The peculiar construction of this—our pit, or bed, renders it unnecessary to prove the bottom-heat by a thermometer; still, one of these instruments should constantly be kept in the frame, to ascertain the heat of the air, which should be constantly kept up by side and end linings, and also by covering up every night, to about  $70^{\circ}$  or  $75^{\circ}$  while the plants are in a young state; and as they advance into that of fruitfulness, this heat, should be made to advance likewise, until it reaches  $80^{\circ}$ , and from this to  $85^{\circ}$ : between these two points, I believe the fruiting plants thrive more than at any other; at the same time, a variation of several degrees, whether below or above, will not in any way injure them; for in an advanced season, when under the powerful influence of SOLAR rays, I have permitted the heat to rise so high, as to have the thermometer range

\* The Author has had fruit which grew four-inches in fourteen hours, but occurrences of this kind being rare, he considers that they should not be received in calculation.



between 100° and 110°, and the plants have not suffered in the least degree from such an extreme, although I had kept the same plants for nearly two weeks at about 40°, while in the seed-bed. On this subject Mr. Mac-Phail, as before hinted, says—“He does not believe that the heat can be raised to more than 96 or 97 degrees, without scorching the plants by top-heat or heated air.” And perhaps Mr. Mac-Phail is right in this opinion, so far as it respects either the common dung-bed, or any brick-pit whatsoever, but not so in such as is above-described, where the elevation of the roof in an advanced season, is supposed to be considerably reduced. Although the plants are capable of bearing these extremes, yet are they in no case to be courted; but on the contrary, the heat should be carefully kept up to its proper height, and air should be admitted freely at the back part of the frame, at all times, when the thermometer indicates it to be anywhere above 75°, except only when fruit of EXTRA-ORDINARY LENGTH and FINENESS is required, in which case IT SHOULD BE REMEMBERED, that with a GOOD DEGREE of STRENGTH in the PLANTS, and HEAT in the BED, there should also be a GREAT HUMIDITY in the AIR. Whenever fresh air is admitted into the bed, whether it be by day or by night, unless when the weather is settled and serene, the mat-guard, or curtain, should always be used, in order that the air may be thereby softened in its passage to the plants.

It is the practice of most growers to shade the plants when they are under a strong sun, or when the sun shines, be it ever so weakly. This is a practice of which I do not approve; consequently, it is but seldom that I make use of it for when all things are right in and about the frame, after uncovering and paying the necessary attention to it in the morning, I give air to the plants proportionate with the existing state of heat, and except in *extreme cases* after leaving them at this time, pay them no more attention until the afternoon; when it is necessary that the lights should be shut down, or covered up for the night.

Watering the plants is a very important operation in the cultivation of the Cucumber, and one which requires some discretion. Under the common modes of cultivating this plant, there is generally a great dampness constantly rising from the dung, or fermenting substance, through the earth, which at an early season, makes it dangerous to give water, except in very small quantities; and even when the plants are evidently in want of it, there is often a hazard in giving them the necessary supply; for if the weather happens to be dull and unfavourable at a time when there is much moisture in the bed, there being but little or no command over a superabundance, it is permitted to remain so long in every part of the bed, that the juices of the plants become so corrupted, as to bring on, or at least to prepare them to receive a disease, commonly known by the

name of "The Canker." This disease is so commonly known as to render a description of it unnecessary; and never having been troubled with it, and being dispossessed of all fear concerning it in future, I will here first refer to what has already been advanced upon the subject of watering in the seedling-bed, and further offer an observation or two.—

That heat and moisture properly applied are consistent with, and beneficial to, the Cucumber, may be easily known by looking at the plants in a hot summer's day, in which, as is sometimes the case, a shower of rain comes on them quickly, and is almost as quickly again dried off by solar influence: Are not its effects surprising? But further, stay until the next morning, and upon the supposition that there has been a warm and a calm night, their improvement will appear to be so great as to beggar description, unless it should so happen that they have been planted in an unfavourable situation, or rather in a soil stagnated with water, and not properly drained. This certainly can never be the case with the bed which I have recommended, and therefore I will dismiss this subject, by stating, that as the plants advance in growth, more water should be given; and when in a fruitful state, the weather, &c. being favourable, they cannot easily receive too much: and by recommending all my readers to range from one extreme to the other, as reason and and experience shall dictate; and also by stating, that except towards evening, when there is a pros-

pect of a cold night, the plants may be watered any time in the day which best suits each one's convenience ; but should this happen near the middle of the day, and the sun at the same time be shining powerfully upon them, they will require to be shaded until the moisture be, in some degree, evaporated, or the influence of the sun, in some measure, subsided.

The season having advanced, and a good supply of fruit for some length of time being obtained from a careful attention to the rules above-stated, it will be needful to make preparation for the next year's seed, before the season is too far advanced.

Choice of seed has already been stated to be an important feature in the growth of the CUCUMBER, and this being the time when choice should be made, it is of consequence that it should be done judiciously. As before stated, the Cucumber family is a very sportive one ; and it often happens, that one and the same seed-fruit produces a great variety of sorts ; and upon the supposition, that there are half-a-dozen chosen therefrom for the purpose of being grown, it is probable, if proper attention has not been paid in saving it, that there will be almost as many distinct kinds. This being the case, it is requisite that attention should be given, not only to secure a fruit which is to produce seed from the most approved kind, but also to have the same fertilized with the pollen of a good variety also. This last-named parent, is, in point of fact, the most im-

portant of the two; and therefore, when a fruit is selected for the above purpose, if there be more sorts than one in the frame, I recommend that the branch, or shoot, which bears it, be laid into the earth just previous to the expansion of the blossom, and covered with about an inch of earth, within a few inches of the fruit, which, together with the shoot that bears it, should be covered with a bell-glass, so pressed into the earth as to exclude any sort of insect; when the blossom is fully expanded, remove the glass, and set, or impregnate the fruit with a male blossom, taken from the best fruit-bearing sort which can be obtained; place the glass over it as before, and so let it remain until the fruit has been set for three or four days, in which time the blossom at its end, will in some measure be decayed. The glass being removed, and the fruit exposed as the others, it will require no extra attention, until it will be grown quite yellow, when it may be cut off the plant—the seed taken out of it, washed, dried, and preserved in the usual way. The plant which bears the seed-fruit, should not be permitted to bear other fruit except in small quantities; suppose for example, there are two plants in one light, or six in a three-light frame: these plants should not be permitted to swell more than three fruit each at any one time, therefore, one at a time beside that which is intended for seed, will be quite sufficient for the seed-bearing plant to produce. But should there be one plant only in a light, and this is better



than more,\* the number of fruit may be increased so as to bear some affinity with the increased pasturage which the plants have to nourish them.

Seed should be sown at intervals, from November until April, for successional crops, which should be done according to the extent of the establishment and quantity of fruit required. The walls of the beds in which they are to be planted, may be reduced in their height and substance as the season advances, and the rubble at their base may be entirely dispensed with, the linings, also, which are indispensably necessary for the purpose of keeping up the heat to the required height in the beds built at an early season, may in like manner be reduced; and if at any time the roots of the plants are found to be growing into them, great care should be exercised that they be not hurt by too powerful an application of heat against them; but if more heat should be required inside the bed than can be given with safety by the linings, this may be remedied by throwing a quantity of hot dung, grass, &c. into the vault and also against its ends, which may be continued until the weather has become serene and settled, when the plants should generally be fully exposed thereto. On the approach of the dull season, however, protection and assistance, as above,

\* The writer's own practice in an advanced season, is, to reduce the number of plants so as to have but one in a three-light frame; and he considers that three of these frames thus employed, are sufficient to produce fruit enough for a large family.

should in some measure be resumed, in order to insure health and fruitfulness in a long continued season.

What has been stated upon the habits and growth of the Cucumber, may principally with propriety be applied to the Melon, but as a few variations are required, I will, hoping they may be serviceable to some of my readers, very briefly notice them.

First, then, I remark that the seed for the first crop need never to be sown before the month of February, being three months later then is recommended for that of Cucumbers; and that in no case should there be more or less than one plant under each light. Next to this, I observe that the earth in which Melons are grown should be of a firm texture, and instead of laying lightly as for Cucumbers, it should be beaten or trodden down firmly: it should also be covered with road scrapings, sifted tolerably fine to the depth of one inch over the whole surface: this, while (in a great measure) it preserves the branches in a sound state, discourages the breed of *Animalculæ*—encourages surface roots—and as an upper stratum, is (with me) indispensable. Another variation is, that as the fruit advances in growth and towards ripening, less water should be given than previously, but at all times extremes should be avoided, in order that there may not be any deterioration of flavour in the fruit, which, by the bye, should not be cut until it sends forth an agreeable odour. The fourth which I notice, is that the plants, generally



speaking, do not require so strong a heat as Cucumber plants do by several degrees; but as this is a subject which can be decided upon only by a knowledge of the tenderness or hardiness of the variety which is under cultivation—I will leave it to be settled accordingly;—at the same time remarking that the Persian varieties invariably form an exception to this rule, for as Mr. Lindley in his *Guide to the Orchard and Kitchen Garden* says, page 239, “Their culture is attended with peculiar difficulties. They are found to require a very high temperature, a dry atmosphere, and an extremely humid soil, while they are at the same time impatient of an undue supply of moisture, which causes spotting and sudden decay long before the fruit is matured.” Mr. Lindley, in continuation of this subject, very clearly shews that the difficulties with which the British gardener has to contend, in the cultivation of these tender and delicious varieties, are very great, and not easily surmounted; and every person who is acquainted with the subject, knows that such have hitherto been the fact, and that Mr. Lindley’s observations thereupon are well worthy of an EXCELLENT AUTHOR. These difficulties, however apparently insurmountable, now no longer exist, but are easily overcome; and the necessary balance of heat and moisture which in Persia arises out of the very nature of the climate and mode of cultivation,” is easily obtained by throwing a sufficient quantity of water into the vault beneath the wattled-work, to cause,

by means of a strong heat, a constant and great exhalation therein, which being condensed collects on every part thereof, and is by capillary attraction, effectual in causing the required humidity in the soil, while at the same time the air inside the frame is kept in a dry state. I would further observe, that the vines or branches of the plants, should be trained upon a trellis, elevated two or three inches above the soil, that they should be pruned but little, and also that the fibres of the plants should be encouraged by an application of liquid manure, which, being excellent, may be composed of serum, or the thin part of bullock's blood, one third—and rain water, two thirds. Each plant should have three or four pints of this liquid given them when the fruit is about the size of a walnut, and the same repeated when they are half grown; it should be poured over the surface of the bed with a common watering-pot, without a rose, and most of it where the roots of the plants are most abundant, for both the appearance and flavour of the fruit is, by a judicious attention to this particular, much improved. But if by any person it should be thought requisite to keep the roots entirely confined to pure food, or earth for the attainment of this object,\* it can be easily done by covering the top of each wall, when they are first built, with slate or boards, or indeed any thing else which would forbid their entering them: but I am fully satisfied that the extent of surface which

\* See London's Encyclopædia of Gardening, page 576, Article 3238.

the bed presents, will (if of a good sort, such for instance as the smooth-skin scarlet-fleshed, or the green Egyptian) under the treatment above recommended, in every case, be sufficient to produce fruit not only fine in appearance, but also, of EXQUISITE FLAVOUR.

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The author of the foregoing treatise having been particularly requested, by several of his friends, to subjoin a few observations on the growth of early potatoes, and being determined upon not receiving any commendation, which in truth belongs to another, he thinks he cannot do better than to produce a copy, or the substance of a communication, which he addressed to a friend some time since, and which conveys the best information his experience enables him to give.

DEAR SIR,

In answer to your enquiries concerning what I consider to be the best mode of managing of early crops of Potatoes, I beg leave to inform you that the subject has been treated upon by several persons in the Gardener's Magazine, and especially by a Denbighshire gardener, volume ii, page 171, 317, consequently the insinuations of an Horticultural Amateur respecting the originality or secrecy of — — mode of growth,



as appeared in the ———, are founded in ignorance, and unworthy the attention of practical, and especially of scientific gardeners.

But you ask me for a statement of my "mode of proceeding with early forced crops." In complying with this request I wish you clearly to understand, that although I have in some measure been acquainted with the system from my youth, still I had not, and in all probability I never should have brought it to my own satisfaction, without reading upon the subject as treated upon in the work above referred to, and as you are a reader thereof, I should not feel disposed to do any thing more than direct your attention to the subject as therein contained, if, as applied to early forced crops, it were not for some deviations from, or improvements upon the rules therein laid down, and which in great brevity I now hand you.

It is, I presume, almost unnecessary for me to state, that a strong bottom-heat and much confinement, or seclusion from the open air, is contrary to the nature and habits of Potatoes; therefore, without entering into detail on the subject of building the bed for them, suffice it that I merely state, that there should be just enough of the fermenting substance used to raise a gentle warmth in the frame, that is, it should be just sufficient to raise the Thermometer to the temperate point.\*

Generally speaking it may be said, that the beginning of the year—January the first, is early enough in the season to commence growing, or making preparation for growing this plant.

Those which are chosen for growth should be of a good early and short-top kind. Those intended for seed should also have been taken up when about three parts grown, and exposed to the action of the sun and air, but not to either the rain, or the dews through the night, until they become quite shrivelled, and which will take from three to six weeks: they should then be put into the earth and on a dry spot three or four feet deep, and there

\* For this purpose the reader will observe the adaptation of a bed built according to the PRINCIPLE of that recommended in the growth of Cucumbers.

remain until within about a month or six weeks of the time of their being planted. When they are taken out of the earth they need not to be cut but planted whole, should cutting, however, be preferred, the crown end—or that which contains the greatest quantity of eyes, is that which should be chosen for the first crop; but whatever is done in this matter, they should be laid on the floor of a warm room or in a hot-house; the floor should be one which resists the entrance of their roots, and each tuber or part of a tuber should lay three or four inches asunder, and the whole covered with a piece of flannel, which should be kept moist until their shoots appear and are grown an inch or two in length, when the covering should be taken off and a quantity of sand put in between them for the purpose of encouraging their roots, which will be very freely emitted from every shoot. The sand should not be less than half an inch nor more than an inch in depth, which should generally be kept moist. When the shoots are grown to the height of four inches the plants will be fit to be planted, or rather transplanted into their final habitation; the surface of which should be a stratum of light soil—nothing better than a mixture of old tan and mortar-rubbish, about six or nine inches deep. Previously to disturbing them, it will be proper to water the sand freely, so that it may adhere to the roots of the plants, upon which will be found numerous young tubers, about the size of marrow-fat peas; these of course must be preserved, and the plants tenderly dealt with. When planted they should be placed in fleet drills, and in no case should the young tubers be covered with more than an inch of soil, until the first crop of them be taken from the plants, when the earth may be drawn round their stems, in order to encourage a reproduction of tubers.

You will remember, that the plants should be exposed to the weather at every favourable opportunity, that is, always when the atmosphere is a few degrees above the freezing point; and in other matters—such as defending them from the

severity of the weather, renewing the heat of the bed, watering, &c. they should be attended to according to general practice.

I remain, Sir,

Yours, &c. &c.

J. SMITH.

WHITTON ROAD,  
IPSWICH, 1832.

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**ERRATA.**

Page 19, instead of Directions for building the Fruiting-bed,  
read—**ON THE CONSTRUCTION AND GENERAL MANAGE-  
MENT OF THE FRUITING-BED.**

Page 18, for loammy, read—loamy.

Page 24, fourth line from the bottom, for began to think on  
this subject, read—began to think on this, as a principle,  
in forcing the vegetable under consideration.

Page 28, eleventh line from the bottom, for the whole length  
of the tube, read—that part of the tube which is between  
the two frames.

## REFERENCE TO THE PLATE.

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### PLAN—FIGURE 1.

- A The Walls.**
- B The Vault.**
- C The Linings**
- D Mushroom or Asparagus-bed**

### FIG: 2. (LONGITUDINAL SECTION)

- A and B The Walls. -**
- 4 The Stakes which bind the rubble at their base.**
- 1 The Holes which should be pierced through them when the linings are built.**
- C The Wattled-work and Dung above them.**
- D The Earth.**
- E The Frame.**
- F The End-linings.**
- G Mushroom or Asparagus-bed.**
- H The Frame for their growth.**
- 2 The Tube which conducts heat from the vault**
- 3 Flue, which is supposed to be stopt up, to prevent overheating the mushroom bed.**

### FIG: 3. (TRANSVERSE SECTION)

- A Walls**
- 2 Rubble at their base**
- B The Vault.**
- C The Linings.**
- D Wattled-work and Dung above the vault.**
- E The Earth.**
- F Lights when closed.**
- G The Lights Raised for the admission of air, with Mat-guard or Curtain.**
- H Flower Pots reversed and fixed in the soil, from which in practice there should be holes pierced to the corner of the vault B.**







